8. $\therefore \left[\frac{p}{v}(v+m)+n\right]\div(v-n)=\frac{p(v+m)+nv}{v(v-n)}=20\frac{8}{9}\%$.

Also solved by *M. E. GRABER.*

ALGEBRA.

125. Proposed by LESLIE L. LOCKE, Instructor in Mathematics, Michigan Agricultural College, Ingram County, Mich.

What special expedient will solve the system

$$\left.\begin{array}{l} x^4-y^4=369\ldots.(1) \\ x-y=1\ \ldots(2) \end{array}\right\}?$$

Solution by O. S. WESTCOTT, Chicago, Ill.; J. SCHEFFER, A. M., Hagerstown, Md.; J. K. ELWOOD, A. M., Pittsburg, Pa.; J. M. BOORMAN, Woodmere, N. Y.; and the PROPOSER.

From (2), $y=x-1$. Substituting this value of y in (1), $x^4-(x-1)^4=369$ or $0.x^4+4x^3-6x^2+4x=370$. Since the coefficient of x^4 is 0, therefore, if we regard the equation as of the fourth degree, one root is ∞. Hence if $x=\infty$, $y=\infty$. The remaining three values of x are found from the equation $2x^3-3x^2+2x-185=0$. This may be solved by the method of Tartaglia; or, by trial if 5 is substituted for x, the first member vanishes. Hence, $x=5$. Dividing $2x^3-3x^2+2x-185=0$, by $x-5$, we have $2x^2+7x+37=0$. $\therefore x=\frac{1}{4}[7\pm\sqrt{(-247)}]$.

$\therefore$ The values of x are ∞, 5, and $\frac{1}{4}[7\pm\sqrt{(-247)}]$, and the values of y are ∞, 4, and $\frac{1}{4}[3\pm\sqrt{(-247)}$.

REMARK. The Proposer says his object in proposing this problem was, 1. To learn if there is a general method of solving such problems when factors can not be readily found, and, 2. To call attention to a fact that is not mentioned in many elementary text-books on Algebra, viz., the loss of a root by dividing one equation by another, or by subtracting one from another if thereby the degree of the equation is diminished.

The above contributors used some modifications in deriving the various steps in the solution ofth is problem, but these modifications were not considered of sufficient importance to warrant separate entries. Solutions were also received from P. S. Berg, G. B. M. Zerr, and H. C. Whitaker. ED. F.

126. Proposed by CHARLES C. CROSS, Meredithville, Va.

A and B run a race; B, who runs slower than A by a miles in b hours, starts first by c minutes, and they get to the n-mile stone together. Required their rates of running. If $a=1$, $b=2$, $c=2$, and $n=4$, what is the result?

Solution by GRANTLAND MURRAY, Adjunt Professor of Mathematics, Emory College, Oxford, Ga.; J. SCHEFFER, A. M., Hagerstown, Md.; H. C. WHITAKER, A. M., Ph. D., Professor of Mathematics, Manual Training School, Philadelphia, Pa.; C. E. ARMENTROUT, A. B., Professor of Latin and Mathematics, Rockingham Military Institute, Mt. Crawford, Va.; P. S. BERG, Principal of Schools, Larimore, N. D.; M. A. GRUBER, A. M., War Department, Washington, D. C.; C. ARTHUR LINDEMANN, A. M., Professor of Mathematics and Science, Virginia Union University, Richmond, Va.; and D. B. NORTHRUP, Mandana, N. Y.

Let x=number of miles A runs per hour, then $x-a/b$=number of miles B runs per hour.

n/x=number of hours A requires to run n miles, $n/(x-a/b)$=number of B requires to run n miles.

$\therefore \frac{n}{x-a/b}-\frac{n}{x}=\frac{c}{60}$, or $bcx^2-acx-60an=0$; whence